

Missouri Department of Natural Resources



PUBLIC NOTICE

DRAFT MISSOURI STATE OPERATING PERMIT

DATE: June 30, 2006

In accordance with the state Clean Water Law, Chapter 644, RSMo, Clean Water Commission regulation 10 CSR 20-6.010, and the federal Clean Water Act, the applicants listed herein have applied for authorization to either discharge to waters of the state or to operate a no-discharge wastewater treatment facility. The proposed permits for these operations are consistent with applicable water quality standards, effluent standards and/or treatment requirements or suitable timetables to meet these requirements (see 10 CSR 20-7.015 and 7.031). All permits will be issued for a period of five years, unless noted otherwise in the Public Notice for that discharge.

On the basis of preliminary staff review and the application of applicable standards and regulations, the Missouri Department of Natural Resources (MDNR), as administrative agent for the Missouri Clean Water Commission, proposes to issue a permit(s) subject to certain effluent limitations, schedules, and special conditions. The proposed determinations are tentative pending public comment.

Persons wishing to comment on the proposed permit conditions are invited to submit them in writing to the Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, Missouri 65102, ATTN: NPDES Permits and Engineering Section / Permit Comments. **Please include the permit number in all comment letters.**

Comments should be confined to the issues relating to the proposed action and permit(s) and the effect on water quality. The MDNR may not consider as relevant comments or objections to a permit based on issues outside the authority of the Clean Water Commission, (see Curd v. Mo. Clean Water Commission, 586 S.W.2d 58 Mo. App. 1979).

All comments must be postmarked by July 31, 2006 or received in our office by 5:00 p.m. on August 3, 2006. The requirement of a signed document makes it impossible to accept email comments for consideration at this time. Comments will be considered in the formulation of all final determinations regarding the applications. If response to this notice indicates significant public interest, a public meeting or hearing may be held after due notice for the purpose of receiving public comment on the proposed permit or determination. Public hearings and/or issuance of the permit will be conducted or processed according to 10 CSR 20-6.020.

Copies of all draft permits and other information including copies of applicable regulations are available for inspection and copying at DNR's website, <http://www.dnr.mo.gov/env/wpp/index.html>, or at the Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, Missouri 65102, between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday.

Public Notice Date: June 30, 2006

Permit Number: MO-0001121

Southeast Regional Office

FACILITY NAME AND ADDRESS

Facility Name: Doe Run, Glover Smelter
Address: Route 1, Box 60, Annapolis, MO 63620

NAME AND ADDRESS OF OWNER

Owner: The Doe Run Company
Address: 1801 Park 270 Place, Suite 300, St. Louis, MO 63146

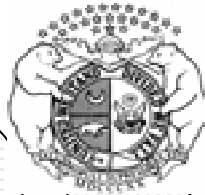
RECEIVING STREAM & LEGAL DESCRIPTION

Receiving Stream: Scoggins Branch (U)
Legal Description: NW ¼, Sec. 11, T32N, R3E, Iron
County

TYPE OF DISCHARGE

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION



MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No. MO-0001121

Owner: The Doe Run Company
Address: 1801 Park 270 Place, Suite 300, St. Louis, MO 63146

Continuing Authority: Same as above
Address: Same as above

Facility Name: Doe Run, Glover Smelter
Address: Route 1, Box 60, Annapolis, MO 63620

Legal Description: NW ¼, Sec. 11, T32N, R3E, Iron County
Latitude/Longitude: Outfall 001: +3728537/-09041312
Outfall 002: +3728478/-09041259
Outfall 003: +3728491/-09041309

Receiving Stream: Scoggins Branch (U)
First Classified Stream and ID: Big Creek (P)(02916)
USGS Basin & Sub-watershed No.: (08020202-040001)

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

FACILITY DESCRIPTION

See page 2

This permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Section 644.051.6 of the Law.

Effective Date

Doyle Childers, Director, Department of Natural Resources
Executive Secretary, Clean Water Commission

Expiration Date
MO 780-0041 (10-93)

Edward Galbraith, Director of Staff, Clean Water Commission

FACILITY DESCRIPTION (continued)

Outfall #001 - SIC #3339

Discharge from the sanitary waste extended aeration plant. This includes flow from employee hand wash, and respirator wash (categorical flows), and employee showers (non-categorical flow). Sludge disposal is by contract hauler.

Design population equivalent is 300.

Design flow is 30,000 gallons per day.

Actual flow is 12,000 gallons per day

Design sludge production is 6.0 dry tons per year.

Outfall #002 - SIC #3339

Non-contact cooling water.

Design flow is 320,000 gallons per day.

Actual flow is 290,000 gallons per day.

Outfall #003 - SIC #3339

Stormwater, process water, and sanitary water is treated in a wastewater plant with a design capacity of 288,000 gallons per day. The treatment consists of the following unit processes:

1. pH adjustment with lime
2. Sedimentation
3. Clarification
4. Filtration
5. Sludge thickening/dewatering

Total design flow is 638,000 GPD.

Water Quality Monitoring Point #004 – Downstream monitoring point

Legal Description: NW ¼, Sec. 11, T32N, R3W, Iron County
Latitude/Longitude: +3728241/-09041169
Receiving Stream: Big Creek (P)(02916)
USGS Basin & Sub-watershed No.: (08020202-040001)

Outfall #005 - at Parshall Flume below Outfalls #001, 002, and 003.

Monitoring to determine contributions from all sources at the facility combined.

Legal Description: NW ¼, Sec. 11, T32N, R3E, Iron County
Latitude/Longitude: +3728477/-09041260
Receiving Stream: Scoggins Branch (U)
First Classified Stream and ID: Big Creek (P)(02916)
USGS Basin & Sub-watershed No.: (08020202-040001)

Outfall S1 – Upstream Monitoring Point on Big Creek.

Legal Description: SW ¼, SW ¼, Sec. 35, T33N, R3E, Iron County
Latitude/Longitude: +3730016/-09041340
Receiving Stream: Scoggins Branch (U)
First Classified Stream and ID: Big Creek (P)(02916)
USGS Basin & Sub-watershed No.: (08020202-040001)

Downstream Monitoring Point– Deleted

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					PAGE NUMBER 3 of 12	
					PERMIT NUMBER MO-0001121	
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The interim effluent limitations shall become effective upon issuance and remain in effect until three (3) years from the date of issuance of this permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:						
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	INTERIM EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Outfall #002</u>						
Flow	MGD	*			once/month	24 hr. total
Lead, Total Recoverable	µg/L	36		36	once/month	grab
Copper, Total Recoverable	µg/L	46		46	once/month	grab
Cadmium, Total Recoverable	µg/L	18		18	once/month	grab
Zinc, Total Recoverable	µg/L	460		460	once/month	grab
Chlorine, Total Residual	mg/L	*		*	once/month	grab
Temperature	°C	****			once/month	grab
pH - Units	SU	***			once/month	grab
Thallium, Total Recoverable	µg/L	56		56	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>MONTHLY</u> ; THE FIRST REPORT IS DUE _____. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
<u>Outfall #003</u>						
Flow	MGD	*		*	daily	24 hr. total
Lead, Total Recoverable	lbs/day	0.673		0.264	once/month	grab
Streamflow > 8 cfs	mg/L	0.080		0.080	once/month	grab
≤ 8 cfs	mg/L	0.027		0.027	once/month	grab
Zinc, Total Recoverable	lbs/day	2.452		0.745	once/month	grab
Streamflow > 8 cfs	mg/L	2.05		1.4	once/month	grab
≤ 8 cfs	mg/L	0.34		0.34	once/month	grab
Cadmium, Total Recoverable	lbs/day	0.481		0.192	once/month	grab
Streamflow > 8 cfs	mg/L	0.046		0.046	once/month	grab
≤ 8 cfs	mg/L	0.013		0.013	once/month	grab
Thallium, Total Recoverable	lbs/day					
Streamflow > 8 cfs	mg/L	0.176		0.176	once/month	grab
≤ 8 cfs	mg/L	0.011		0.011	once/month	grab
Total Suspended Solids	lbs/day	36.056		24.036	once/month	grab
Total Suspended Solids	mg/L	*		*	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>MONTHLY</u> ; THE FIRST REPORT IS DUE _____.						
<u>Outfall 003</u>						
Whole Effluent Toxicity (WET) Test	% Survival	See Special Condition #11			four/year	24 hr. composite
MONITORING REPORTS SHALL BE SUBMITTED <u>QUARTERLY</u> ; THE FIRST REPORT IS DUE _____. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					PAGE NUMBER 4 of 12	
					PERMIT NUMBER MO-0001121	
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective three (3) years from the date of issuance of this permit and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:						
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #002						
Flow	MGD	*			once/month	24 hr. total
Lead, Total Recoverable	µg/L	6.0		2.9	once/month	grab
Copper, Total Recoverable	µg/L	6.8		3.4	once/month	grab
Cadmium, Total Recoverable	µg/L	0.52		0.26	once/month	grab
Zinc, Total Recoverable	µg/L	218		109	once/month	grab
Chlorine, Total Residual	µg/L	16.5		8.2	once/month	grab
Temperature	°C	****		****	once/month	grab
pH – Units	SU	*****		*****	once/month	grab
Thallium, Total Recoverable	µg/L	10.3		5.1	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE _____. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
Outfall #003						
Flow	MGD	*		*	daily	24 hr. total
Lead, Total Recoverable	lbs/day	0.012			once/month	grab
Lead, Total Recoverable	µg/L	6.0		2.9	once/month	grab
Zinc, Total Recoverable	lbs/day	0.512			once/month	grab
Zinc, Total Recoverable	µg/L	218		109	once/month	grab
Cadmium, Total Recoverable	lbs/day	0.001		0.192	once/month	grab
Cadmium, Total Recoverable	µg/L	0.52		0.26	once/month	grab
Thallium, Total Recoverable	µg/L	10.3		5.1	once/month	grab
Selenium, Total Recoverable	µg/L	8.1		4.0	once/month	grab
Total Suspended Solids	lbs/day	36.056		24.036	once/month	grab
	mg/L		45	30	once/month	grab
Biochemical Oxygen Demand	mg/L	*		*	once/month	grab
pH	SU	***		***	once/month	grab
Ammonia as Nitrogen	mg/L	*		*	once/month	grab
Total Residual Chlorine	µg/L	*		*	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE _____.						
Outfall 003						
Whole Effluent Toxicity (WET) Test	% Survival	See Special Condition #11			four/year	24 hr. composite
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE _____. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					PAGE NUMBER 5 of 12	
					PERMIT NUMBER MO-0001121	
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:						
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Outfall #001</u>						
Flow	MGD	*		*	once/month	24 hr. total
Chlorine, Total Residual	mg/L	16.5		8.2	once/month	grab
Total Suspended Solids	lbs/day	1.467		0.930	once/month	grab
Total Suspended Solids	mg/L		45	30	once/month	grab
Lead, Total Recoverable	lbs/day	0.0046		0.0019	once/month	grab
Lead, Total Recoverable	µg/L	*		*	once/month	grab
Zinc, Total Recoverable	lbs/day	0.0169		0.00578	once/month	grab
Zinc, Total Recoverable	µg/L	*		*	once/month	grab
Cadmium, Total Recoverable	lbs/day	0.0033		0.0013	once/month	grab
Cadmium, Total Recoverable	µg/L	*		*	once/month	grab
Fecal Coliform**	#/100mL	1000		400	once/month	grab
Biochemical Oxygen Demands	mg/L		45	30	once/month	grab
pH - Units	SU	***		***	once/month	grab
Copper, Total Recoverable	µg/L	*		*	once/month	grab
Thallium, Total Recoverable	µg/L	*		*	once/month	grab
Hardness	mg/L	*		*	once/month	grab
Ammonia as Nitrogen	mg/L				once/month	grab
(May 1-Oct 31)		3.7		1.9		
(Nov 1-April 30)		7.5		3.7		
MONITORING REPORTS SHALL BE SUBMITTED <u>MONTHLY</u> ; THE FIRST REPORT IS DUE _____. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					PAGE NUMBER 6 of 12	
					PERMIT NUMBER MO-0001121	
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:						
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Outfall #004 & S1</u>						
Temperature (Note 1)	°C	*		*	once/month	grab
pH – Units	SU	*		*	once/quarter*****	grab
Hardness	mg/L	*		*	once/quarter*****	grab
Lead, Total Recoverable	µg/L	*		*	once/quarter*****	grab
Zinc, Total Recoverable	µg/L	*		*	once/quarter*****	grab
Cadmium, Total Recoverable	µg/L	*		*	once/quarter *****	grab
Copper, Total Recoverable	µg/L	*		*	once/quarter *****	grab
Selenium, Total Recoverable	µg/L	*		*	once/quarter*****	grab
Thallium, Total Recoverable	µg/L	*		*	once/quarter *****	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>QUARTERLY</u> ; THE FIRST REPORT IS DUE _____. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
<u>Outfall 005</u>						
Flow	MGD	*		*	once/month	24 hr. estimate
Hardness	mg/L	*		*	once/month	grab
Temperature	°C	*		*	once/month	grab
pH - Units	SU	*		*	once/month	grab
Lead, Total Recoverable	µg/L	*		*	once/month	grab
Zinc, Total Recoverable	µg/L	*		*	once/month	grab
Cadmium, Total Recoverable	µg/L	*		*	once/month	grab
Thallium, Total Recoverable	µg/L	*		*	once/month	grab
Copper, Total Recoverable	µg/L	*		*	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>MONTHLY</u> ; THE FIRST REPORT IS DUE _____. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					PAGE NUMBER 7 of 12	
					PERMIT NUMBER MO-0001121	
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:						
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Outfall #006 – Stormwater retention pond emergency overflow						
Flow	MGD	*		*	once/discharge/day	24 hr. estimate
Lead, Total Recoverable	lbs/day	0.012			once/discharge/day	grab
Lead, Total Recoverable	µg/L	6.0		2.9	once/discharge/day	grab
Zinc, Total Recoverable	lbs/day	0.512			once/discharge/day	grab
Zinc, Total Recoverable	µg/L	218		109	once/discharge/day	grab
Cadmium, Total Recoverable	lbs/day	0.001		0.192	once/discharge/day	grab
Cadmium, Total Recoverable	µg/L	0.52		0.26	once/discharge/day	grab
Thallium, Total Recoverable	µg/L	10.3		5.1	once/discharge/day	grab
Selenium, Total Recoverable	µg/L	8.1		4.0	once/discharge/day	grab
Total Suspended Solids	lbs/day	36.056		24.036	once/discharge/day	grab
Total Suspended Solids	mg/L			30	once/discharge/day	grab
Biochemical Oxygen Demand	mg/L		45	*	once/discharge/day	grab
pH	SU	***		***	once/discharge/day	grab
Ammonia as Nitrogen	mg/L	*		*	once/discharge/day	grab
Total Residual Chlorine	µg/L	*		*	once/discharge/day	grab
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE _____. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
B. STANDARD CONDITIONS						
IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED Parts I & III STANDARD CONDITIONS DATED October 1, 1980, AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.						

MO 780-0010 (8/91)

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

- * Monitoring requirement only.
- ** Final limitations and monitoring requirements for Fecal Coliform are applicable only during the recreational season from April 1 through October 31. Sample in June and September.
- *** pH is measured in pH units and is not to be averaged. The pH is limited to the range of 7.5-9.0 pH units.
- **** Effluent shall not elevate or depress the temperature of the receiving stream beyond the mixing zone more than five (5°)F. The stream temperature beyond the mixing zone shall not exceed eighty-four (84°)F due to the effluent.
- ***** Sample once per quarter in the months of March, June, September, and December.
- ***** pH is measured in pH units and is not to be averaged. The pH is limited to the range of 6.0-9.0 pH units.

Note 1 - The monthly upstream and downstream sample for Temperature will be taken on the same day as Outfalls #003, #004, and #005 are sampled.

C. SPECIAL CONDITIONS

1. This permit may be reopened and modified, or alternatively revoked and reissued, to:
 - (a) Comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a) (2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:
 - (1) contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or
 - (2) controls any pollutant not limited in the permit.
 - (b) Incorporate new or modified effluent limitations or other conditions, if the result of a waste load allocation study, toxicity test or other information indicates changes are necessary to assure compliance with Missouri's Water Quality Standards.
 - (c) Incorporate new or modified effluent limitations or other conditions if, as the result of a watershed analysis, a Total Maximum Daily Load (TMDL) limitation is developed for the receiving waters which are currently included in Missouri's list of waters of the state not fully achieving the state's water quality standards, also called the 303(d) list.

The permit as modified or reissued under this paragraph shall also contain any other requirements of the Clean Water Act then applicable.
2. All outfalls must be clearly marked in the field.
3. Changes in Discharges of Toxic Substances

The permittee shall notify the Director as soon as it knows or has reason to believe:

 - (a) That any activity has occurred or will occur which would result in the discharge of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"
 - (1) One hundred micrograms per liter (100 µg/L);
 - (2) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,5 dinitrophenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
 - (3) Five (5) times the maximum concentration value reported for the pollutant in the permit application;
 - (4) The level established in Part A of the permit by the Director.
 - (b) That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant, which was not reported in the permit application.
5. Report as no-discharge when a discharge does not occur during the report period.
6. Water Quality Standards
 - (a) Discharges to waters of the state shall not cause a violation of water quality standards rule under 10 CSR 20-7.031, including both specific and general criteria.
 - (b) General Criteria. The following general water quality criteria shall be applicable to all waters of the state at all times including mixing zones. No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:
 - (1) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;
 - (2) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses;
 - (3) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses;
 - (4) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life;
 - (5) There shall be no significant human health hazard from incidental contact with the water;
 - (6) There shall be no acute toxicity to livestock or wildlife watering;
 - (7) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community;
 - (8) Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to section 260.200-260.247.

C. SPECIAL CONDITIONS (continued)

7. Sludge and Biosolids Use For Domestic Wastewater Treatment Facilities
 - (a) Permittee shall comply with the pollutant limitations, monitoring, reporting, and other requirements in accordance with the attached permit Standard Conditions.
 - (b) If sludge is not removed by a contract hauler, permittee is authorized to land apply biosolids. Permit Standard Conditions, Part III shall apply to the land application of biosolids. The department may require submittal of a biosolids management plan for department review and approval as determined appropriate on a case-by-case basis.
8. If the permittee does not discharge effluent from Outfall #001 and instead pumps that effluent to the stormwater basin for further treatment to remove metals, the permittee must test for Biochemical Oxygen Demand₅ and Fecal Coliform prior to commingling this effluent with the stormwater. The limits for Biochemical Oxygen Demand₅ and Fecal Coliform shall be the same as for the effluent had it been discharged for Outfall #001. This data must be reported with the discharge monitoring reports for Outfall #003. The permittee may then report no discharge from Outfall #001 if none has occurred from Outfall #001 during the month.
9. Any sludge removed shall be processed through the smelting process, or the Missouri Department of Natural Resources shall be contacted for approval of the alternate disposal proposal.
10. A Quality assurance/Quality control (QA/QC) plan shall be maintained for samples analyzed by the permittee, and QA/QC plans submitted for any other laboratories which will be used to fulfill monitoring requirements.
11. By January 31st of each year starting in 1999, Doe Run shall submit a report to the Southeast Regional office, the Water Pollution Control Program (WPCP) - Central Office, and United States Environmental Protection Agency (EPA) Region VII that reports in tabular form the data from Outfalls S1, #004, and #005 from the previous year or partial year.

The report shall compare the data with the appropriate water quality standards for each of the above monitoring points and shall indicate whether the standard was met or exceeded. The data from each of the above points shall include concentration of pollutants, flow, and mass of pollutants in pounds per day.

The report is due January 31st of each year.
12. If monitoring data indicates that water quality standards are being exceeded at water quality monitoring point #004, Outfall #005, or the downstream monitoring point, this permit may be reopened and modified to establish limits to protect water quality at any of the above points.
13. Whole Effluent Toxicity (WET) tests shall be conducted as follows:

SUMMARY OF WET TESTING FOR THIS PERMIT				
OUTFALL	A.E.C. %	FREQUENCY	SAMPLE TYPE	MONTHS
#003	100%	Once/quarter	24 hr. composite or grab	March, June, August, November

- (a) Test Schedule and Follow-Up Requirements
 - (1) Perform a SINGLE-dilution test in the months and at the frequency specified above. For tests which are successfully passed, submit test results USING THE DEPARTMENT'S WET TEST REPORT FORM #MO-780-1899 along with complete copies of the test reports as received from the laboratory, including copies of chain-of-custody forms within 30 calendar days of availability to the WATER PROTECTION PROGRAM, P.O. Box 176, Jefferson City, MO 65102. If the effluent passes the test, do not repeat the test until the next test period.
 - (a) For discharges of stormwater, samples shall be collected within three hours from when discharge first occurs.
 - (b) Samples submitted for analysis of stormwater discharges shall be collected as a grab.

C. SPECIAL CONDITIONS (continued)

- (c) For discharges of non-stormwater, samples shall be collected only when precipitation has not occurred for a period of forty-eight hours prior to sample collection. In no event shall sample collection occur simultaneously with the occurrence of precipitation excepting for stormwater samples.
 - (d) A twenty-four hour composite sample shall be submitted for analysis of non-stormwater discharges.
 - (e) Upstream receiving water samples, where required, shall be collected upstream from any influence of the effluent where downstream flow is clearly evident.
 - (f) Samples submitted for analysis of upstream receiving water may be collected as either a grab or twenty-four-hour composite as appropriate to the nature of the discharge.
 - (g) Chemical and physical analysis of the upstream control and effluent sample shall occur immediately upon being received by the laboratory, prior to any manipulation of the effluent sample beyond preservation methods consistent with federal guidelines for WET testing that are required to stabilize the sample during shipping.
 - (h) Any and all chemical or physical analysis of the effluent sample performed in conjunction with the WET test shall be performed at the 100% Effluent concentration in addition to analyses performed upon any other effluent concentration.
 - (i) All chemical analyses included in the Missouri Department of Natural Resources WET test report form #MO-780-1899 shall be performed and results shall be recorded in the appropriate field of the report form.
 - (j) Where flow-weighted composite sample is required for analysis, the samples shall be composited at the laboratory where the test is to be performed.
 - (k) Where in stream testing is required downstream from the discharge, sample collection shall occur immediately below the established Zone of Initial Dilution in conjunction with or immediately following a release or discharge.
 - (l) Samples submitted for analysis of downstream receiving water may be collected as either a grab or twenty-four-hour composite as appropriate to the nature of the discharge.
 - (m) All instream samples, including downstream samples, shall be tested for toxicity at the 100% concentration in addition to any other assigned AEC for in-stream samples.
- (2) All failing test results along with complete copies of the test reports as received from the laboratory, INCLUDING THOSE TESTS CONDUCTED UNDER CONDITION (3) BELOW, shall be reported to the WATER PROTECTION PROGRAM, P.O. Box 176, Jefferson City, MO 65102 within 14 calendar days of the availability of the results.
- (3) If the effluent fails the test, a multiple dilution test shall be performed within 30 calendar days and biweekly thereafter, until one of the following conditions are met:
- (a) THREE CONSECUTIVE MULTIPLE-DILUTION TESTS PASS. No further tests need to be performed until next regularly scheduled test period.
 - (b) A TOTAL OF THREE MULTIPLE-DILUTION TESTS FAIL.
- (4) Failure of at least two multiple-dilution tests during any period of accelerated monitoring violates the permit narrative requirement for aquatic life protection.
- (5) The permittee shall submit a CONCISE summary of all test results for the test series to the WATER PROTECTION PROGRAM, P.O. Box 176, Jefferson City, MO 65102 within 14 calendar days of the third failed test.
- (6) Additionally, the following shall apply upon failure of the third MULTIPLE DILUTION test: A toxicity identification evaluation (TIE) or toxicity reduction evaluation (TRE) is automatically triggered. The permittee shall contact THE WATER PROTECTION PROGRAM within 14 calendar days from availability of the test results to ascertain as to whether a TIE or TRE is appropriate. The permittee shall submit a plan for conducting a TIE or TRE to the WATER PROTECTION PROGRAM within 60 calendar days of the date of DNR's direction to perform either a TIE or TRE. This plan must be approved by DNR before the TIE or TRE is begun. A schedule for completing the TIE or TRE shall be established in the plan approval.
- (7) Upon DNR's approval, the TIE/TRE schedule may be modified if toxicity is intermittent during the TIE/TRE investigations. A revised WET test schedule may be established by DNR for this period.
- (8) If a previously completed TIE has clearly identified the cause of toxicity, additional TIEs will not be required as long as effluent characteristics remain essentially unchanged and the permittee is proceeding according to a DNR approved schedule to complete a TRE and reduce toxicity. Regularly scheduled WET testing as required in the permit, without the follow-up requirements, will be required during this period.
- (9) When WET test sampling is required to run over one DMR period, each DMR report shall contain a copy of the Department's WET test report form that was generated during the reporting period.
- (10) Submit a concise summary in tabular format of all test results with the annual report.

C. SPECIAL CONDITIONS (continued)

(b) PASS/FAIL procedure and effluent limitations:

- (1) To pass a single-dilution test, mortality observed in the AEC test concentration shall not be significantly different (at the 95% confidence level; $p = 0.05$) than that observed in the upstream receiving-water control sample. Where upstream receiving water is not available mortality observed in the AEC test concentration shall not be significantly different (at the 95% confidence level; $p = 0.05$) than that observed in the laboratory control. The appropriate statistical tests of significance shall be consistent with the most current edition of METHODS FOR MEASURING THE ACUTE TOXICITY OF EFFLUENTS AND RECEIVING WATERS TO FRESHWATER AND MARINE ORGANISMS or other Federal guidelines as appropriate or required.
- (2) To pass a multiple-dilution test:
 - (a) For facilities with a computed percent effluent at the edge of the zone of initial dilution, Allowable Effluent Concentration (AEC), OF 30% OR LESS THE AEC must be less than three-tenths (0.3) of the LC_{50} concentration for the most sensitive of the test organisms; **OR**,
 - (b) For facilities with an AEC greater than 30% the LC_{50} concentration must be greater than 100%; **AND**,
 - (c) all effluent concentrations equal to or less than the AEC must be nontoxic. Mortality observed in all effluent concentrations equal to or less than the AEC shall not be significantly different (at the 95% confidence level; $p = 0.05$) than that observed in the upstream receiving-water control sample. Where upstream receiving water is not available mortality observed in the AEC test concentration shall not be significantly different (at the 95% confidence level; $p = 0.05$) than that observed in the laboratory control. The appropriate statistical tests of significance shall be consistent with the most current edition of METHODS FOR MEASURING THE ACUTE TOXICITY OF EFFLUENTS AND RECEIVING WATERS TO FRESHWATER AND MARINE ORGANISMS or other federal guidelines as appropriate or required. Failure of one multiple-dilution test may be considered an effluent limit violation.

(c) Test Conditions

- (1) Test Type: Acute Static non-renewal
- (2) Test species: Ceriodaphnia dubia and Pimephales promelas (fathead minnow). Organisms used in WET testing shall come from cultures reared for the purpose of conducting toxicity tests and cultured in a manner consistent with the most current USEPA guidelines. All test animals shall be cultured as described in the most current edition of METHODS FOR MEASURING THE ACUTE TOXICITY OF EFFLUENTS AND RECEIVING WATERS TO FRESHWATER AND MARINE ORGANISMS.
- (3) Test period: 48 hours at the "Acceptable Effluent Concentration" (AEC) specified above.
- (4) When dilutions are required, upstream receiving stream water shall be used as dilution water. If upstream water is unavailable or if mortality in the upstream water exceeds 10%, "reconstituted" water will be used as dilution water. Procedures for generating reconstituted water will be supplied by the MDNR upon request.
- (5) Single-dilution tests will be run with:
 - (a) Effluent at the AEC concentration;
 - (b) 100% receiving-stream water (if available), collected upstream of the outfall at a point beyond any influence of the effluent; and
 - (c) reconstituted water.
- (6) Multiple-dilution tests will be run with:
 - (a) 100%, 50%, 25%, 12.5%, and 6.25% effluent, unless the AEC is less than 25% effluent, in which case dilutions will be 4 times the AEC, two times the AEC, AEC, 1/2 AEC and 1/4 AEC;
 - (b) 100% receiving-stream water (if available), collected upstream of the outfall at a point beyond any influence of the effluent; and
 - (c) reconstituted water.
- (7) If reconstituted-water control mortality for a test species exceeds 10%, the entire test will be rerun.
- (8) If upstream control mortality exceeds 10%, the entire test will be rerun using reconstituted water as the dilutant.

SUMMARY OF TEST METHODOLOGY FOR WHOLE-EFFLUENT TOXICITY TESTS

Whole-effluent-toxicity test required in NPDES permits shall use the following test conditions when performing single or multiple dilution methods. Any future changes in methodology will be supplied to the permittee by the Missouri Department of Natural Resources (MDNR). Unless more stringent methods are specified by the DNR, the procedures shall be consistent with the most current edition of Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms.

Test conditions for Ceriodaphnia dubia:

Test duration:	48 h
Temperature:	25 ± 1°C Temperatures shall not deviate by more than 3°C during the test.
Light Quality:	Ambient laboratory illumination
Photoperiod:	16 h light, 8 h dark
Size of test vessel:	30 mL (minimum)
Volume of test solution:	15 mL (minimum)
Age of test organisms:	<24 h old
No. of animals/test vessel:	5
No. of replicates/concentration:	4
No. of organisms/concentration:	20 (minimum)
Feeding regime:	None (feed prior to test)
Aeration:	None
Dilution water:	Upstream receiving water; if no upstream flow, synthetic water modified to reflect effluent hardness.
Endpoint:	Pass/Fail (Statistically significant Mortality when compared to upstream receiving water control or synthetic control if upstream water was not available at $p \leq 0.05$)
Test acceptability criterion:	90% or greater survival in controls

Test conditions for Pimephales promelas:

Test duration:	48 h
Temperature:	25 ± 1°C Temperatures shall not deviate by more than 3°C during the test.
Light Quality:	Ambient laboratory illumination
Photoperiod:	16 h light/ 8 h dark
Size of test vessel:	250 mL (minimum)
Volume of test solution:	200 mL (minimum)
Age of test organisms:	1-14 days (all same age)
No. of animals/test vessel:	10
No. of replicates/concentration:	4 (minimum) single dilution method 2 (minimum) multiple dilution method
No. of organisms/concentration:	40 (minimum) single dilution method 20 (minimum) multiple dilution method
Feeding regime:	None (feed prior to test)
Aeration:	None, unless DO concentration falls below 4.0 mg/L; rate should not exceed 100 bubbles/min.
Dilution water:	Upstream receiving water; if no upstream flow, synthetic water modified to reflect effluent hardness.
Endpoint:	Pass/Fail (Statistically significant Mortality when compared to upstream receiving water control or synthetic control if upstream water was not available at $p \leq 0.05$)
Test Acceptability criterion:	90% or greater survival in controls



Missouri Department of Natural Resources
Water Protection Program
Water Pollution Control Branch
NPDES Permits & Engineering Section

Water Quality Review Sheet

Determination of Effluent Limits

Facility Information

FACILITY NAME: Glover Smelter NPDES #: MO-0001121

FACILITY TYPE/DESCRIPTION: Primary lead smelter and refining facility

EDU: Ozark / Upper St. Francis / Castor Drainages 8-DIGIT HUC: 08020202 COUNTY: Iron
EDU = Ecological Drainage Unit

LEGAL DESCRIPTION: NW ¼, Sec. 11, T32N, R3E LATITUDE/LONGITUDE: +3728537/-09041312

WATER QUALITY HISTORY: Occasional exceedence of effluent limits.

Outfall Characteristics

OUTFALL	DESIGN FLOW (CFS)	TREATMENT TYPE	RECEIVING WATERBODY
001	0.047	Secondary, then flows to 003	Scroggins Branch
002	0.50	Non-contact cooling water	Scroggins Branch
003	0.45	Process wastewater, primary lead sub category	Scroggins Branch
004		Downstream monitoring	Big Creek above confluence with Little Creek
005	1.0	Monitoring of contributions from Outfalls 001-003	Scroggins Branch
006	0.39	Emergency discharge from holding basin	Scroggins Branch
S1		Upstream monitoring	Big Creek above confluence with Scroggins Branch

Receiving Waterbody Information

WATERBODY	CLASS	WBID	1Q10 (CFS)	7Q10 (CFS)	30Q10 (CFS)	*DESIGNATED USES
Scroggins Branch	U	N.A.	0.0	0.0	0.0	General Criteria
Big Creek	P	2916	0.1	0.1	1.0	AQL, CLF, LWW, WBC, SCR

*Cool Water Fishery (CLF), Cold Water Fishery (CDF), Irrigation (IRR), Industrial (IND), Secondary Contact Recreation (SCR), Drinking Water Supply (DWS), Whole Body Contact Recreation (WBC), Protection of Warmwater Aquatic Life and Human Health (AQL), Livestock & Wildlife Watering (LWW)

COMMENTS: Big Creek is on the 303(d) list for Metals (Cadmium, Lead, Selenium, Thallium and Zinc). The
source of the contamination is the Glover Smelter. Effluent limits in this WQRS were developed to
alleviate the contamination.
Outfall 001 flows to 003 for additional treatment before discharge.

MIXING CONSIDERATIONS

Mixing Zone (MZ). Not allowed. 10 CSR 20-7.031(4)(A)4.B.(I)(a)

Zone of Initial Dilution (ZID). Not allowed. 10 CSR 20-7.031(4)(A)4.B.(I)(b)

	Flow (cfs)	MZ (cfs)	ZID (cfs)
7Q10	0.0	0.0	0.0
1Q10	0.0	0.0	0.0
30Q10	0.0	0.0	N/A

Permit Limits And Information

TMDL WATERSHED:
(Y OR N)

☒

W.L.A. STUDY CONDUCTED:
(Y OR N)

☒

DISINFECTION REQUIRED:
(Y OR N)

☒

USE ATTAINABILITY
ANALYSIS (Y,N)

☐

OUTFALL# 001

WET TEST (Y OR N): ☒ FREQUENCY: _____ A.E.C. _____ LIMIT: _____

PARAMETER	UNITS	MAXIMUM DAILY LIMIT	WEEKLY AVERAGE LIMIT	AVERAGE MONTHLY LIMIT	MONITORING FREQUENCY
FLOW		MONITOR		MONITOR	DAILY
BIOCHEMICAL OXYGEN DEMAND (BOD ₅)	mg/L		45	30	ONCE/MONTH
TOTAL SUSPENDED SOLIDS	mg/L		45	30	ONCE/MONTH
TOTAL SUSPENDED SOLIDS	lbs/day	1.467		0.930	
PH	SU	7.5-9		7.5-9	ONCE/MONTH
AMMONIA AS N	mg/L	3.7		1.9	ONCE/MONTH
AMMONIA AS N	mg/L	7.5		3.7	ONCE/MONTH
FECAL COLIFORM	NOTE 1	1000		400	ONCE/MONTH
TOTAL RESIDUAL CHLORINE	mg/L	16.5		8.2	ONCE/MONTH
CADMIUM, TOTAL RECOVERABLE	lbs/day	0.0033		0.0013	ONCE/MONTH
CADMIUM, TOTAL RECOVERABLE	µg/L	MONITOR		MONITOR	ONCE/MONTH
COPPER, TOTAL RECOVERABLE	µg/L	MONITOR		MONITOR	ONCE/MONTH
LEAD, TOTAL RECOVERABLE	lbs/day	0.0046		0.0019	ONCE/MONTH
LEAD, TOTAL RECOVERABLE	µg/L	MONITOR		MONITOR	ONCE/MONTH
SELENIUM, TOTAL RECOVERABLE	µg/L	MONITOR		MONITOR	ONCE/MONTH
THALLIUM, TOTAL RECOVERABLE	µg/L	MONITOR		MONITOR	ONCE/MONTH
ZINC, TOTAL RECOVERABLE	lbs/day	0.0169		0.00578	ONCE/MONTH
ZINC, TOTAL RECOVERABLE	µg/L	MONITOR		MONITOR	ONCE/MONTH

NOTE 1 – COLONIES/100 mL,

OUTFALL# 002WET TEST (Y OR N): ☒ FREQUENCY: ONCE/YEAR A.E.C. 100% LIMIT: 10 CSR 20-7.031(3)(I)2.

$$\text{A.E.C. \%} = \left(\frac{\text{Design Flow} + \text{Zone of Initial Dilution}}{\text{Design Flow}} \right)^{-1} \times 100$$

PARAMETER	UNITS	MAXIMUM DAILY LIMIT	WEEKLY AVERAGE LIMIT	AVERAGE MONTHLY LIMIT	MONITORING FREQUENCY
FLOW		MONITOR		MONITOR	DAILY
PH	SU	6-9		6-9	ONCE/MONTH
TOTAL RESIDUAL CHLORINE	µg/L	16.5		8.2	ONCE/MONTH
TEMPERATURE	°C	MONITOR		MONITOR	ONCE/MONTH
CADMIUM, TOTAL RECOVERABLE	µg/L	0.52		0.26	ONCE/MONTH
COPPER, TOTAL RECOVERABLE	µg/L	6.8		3.4	ONCE/MONTH
LEAD, TOTAL RECOVERABLE	µg/L	6.0		2.9	ONCE/MONTH
SELENIUM, TOTAL RECOVERABLE	µg/L	8.1		4.0	ONCE/MONTH
THALLIUM, TOTAL RECOVERABLE	µg/L	10.3		5.1	ONCE/MONTH
ZINC, TOTAL RECOVERABLE	µg/L	218		109	ONCE/MONTH

OUTFALL# 003WET TEST (Y OR N): ☒ Y FREQUENCY: ONCE/QUARTER A.E.C. 100% LIMIT: 10 CSR 20-7.031(3)(I)2.

$$\text{A.E.C. \%} = \left(\frac{\text{Design Flow} + \text{Zone of Initial Dilution}}{\text{Design Flow}} \right)^{-1} \times 100$$

PARAMETER	UNITS	MAXIMUM DAILY LIMIT	WEEKLY AVERAGE LIMIT	AVERAGE MONTHLY LIMIT	MONITORING FREQUENCY
FLOW		MONITOR		MONITOR	DAILY
BIOCHEMICAL OXYGEN DEMAND (BOD ₅)	mg/L		45	30	ONCE/MONTH
TOTAL SUSPENDED SOLIDS	lbs/day	36.056		24.036	ONCE/MONTH
TOTAL SUSPENDED SOLIDS	mg/L		45	30	ONCE/MONTH
PH	SU	7.5-9		7.5-9	ONCE/MONTH
AMMONIA AS N	mg/L	MONITOR		MONITOR	ONCE/MONTH
TOTAL RESIDUAL CHLORINE	mg/L	MONITOR		MONITOR	ONCE/MONTH
CADMIUM, TOTAL RECOVERABLE	lbs/day	0.001			ONCE/MONTH
CADMIUM, TOTAL RECOVERABLE	µg/L	0.52		0.26	ONCE/MONTH
COPPER, TOTAL RECOVERABLE	µg/L	6.8		3.4	ONCE/MONTH
LEAD, TOTAL RECOVERABLE	lbs/day	0.012			ONCE/MONTH
LEAD, TOTAL RECOVERABLE	µg/L	6.0		2.9	ONCE/MONTH
SELENIUM, TOTAL RECOVERABLE	µg/L	8.1		4.0	ONCE/MONTH
THALLIUM, TOTAL RECOVERABLE	µg/L	10.3		5.1	ONCE/MONTH
ZINC, TOTAL RECOVERABLE	lbs/day	0.512			ONCE/MONTH
ZINC, TOTAL RECOVERABLE	µg/L	218		109	ONCE/MONTH

OUTFALL# 005WET TEST (Y OR N): ☐ N FREQUENCY: _____ A.E.C. _____ LIMIT: _____

PARAMETER	UNITS	MAXIMUM DAILY LIMIT	WEEKLY AVERAGE LIMIT	AVERAGE MONTHLY LIMIT	MONITORING FREQUENCY
PH	SU	MONITOR		MONITOR	ONCE/MONTH
HARDNESS, TOTAL	mg/L	MONITOR		MONITOR	ONCE/MONTH
CADMIUM, TOTAL RECOVERABLE	µg/L	MONITOR		MONITOR	ONCE/MONTH
COPPER, TOTAL RECOVERABLE	µg/L	MONITOR		MONITOR	ONCE/MONTH
LEAD, TOTAL RECOVERABLE	µg/L	MONITOR		MONITOR	ONCE/MONTH
SELENIUM, TOTAL RECOVERABLE	µg/L	MONITOR		MONITOR	ONCE/MONTH
THALLIUM, TOTAL RECOVERABLE	µg/L	MONITOR		MONITOR	ONCE/MONTH
ZINC, TOTAL RECOVERABLE	µg/L	MONITOR		MONITOR	ONCE/MONTH

OUTFALL# 006WET TEST (Y OR N): ☒ Y FREQUENCY: ONCE/DISCHARGE A.E.C. 100% LIMIT: 10 CSR 20-7.031(3)(I)2.

$$\text{A.E.C. \%} = \left(\frac{\text{Design Flow} + \text{Zone of Initial Dilution}}{\text{Design Flow}} \right)^{-1} \times 100$$

PARAMETER	UNITS	MAXIMUM DAILY LIMIT	WEEKLY AVERAGE LIMIT	AVERAGE MONTHLY LIMIT	MONITORING FREQUENCY
FLOW		MONITOR		MONITOR	ONCE/DISCHARGE/DAY
BIOCHEMICAL OXYGEN DEMAND (BOD ₅)	mg/L		45	30	ONCE/DISCHARGE/DAY
TOTAL SUSPENDED SOLIDS	mg/L		45	30	ONCE/DISCHARGE/DAY
pH	SU	7.5-9		7.5-9	ONCE/DISCHARGE/DAY
AMMONIA AS N	mg/L	MONITOR		MONITOR	ONCE/DISCHARGE/DAY
TOTAL RESIDUAL CHLORINE	mg/L	MONITOR		MONITOR	ONCE/DISCHARGE/DAY
CADMIUM, TOTAL RECOVERABLE	µg/L	0.52		0.26	ONCE/DISCHARGE/DAY
COPPER, TOTAL RECOVERABLE	µg/L	6.8		3.4	ONCE/DISCHARGE/DAY
LEAD, TOTAL RECOVERABLE	µg/L	6.0		2.9	ONCE/DISCHARGE/DAY
SELENIUM, TOTAL RECOVERABLE	µg/L	8.1		4.0	ONCE/DISCHARGE/DAY
THALLIUM, TOTAL RECOVERABLE	µg/L	10.3		5.1	ONCE/DISCHARGE/DAY
ZINC, TOTAL RECOVERABLE	µg/L	218		109	ONCE/DISCHARGE/DAY

OUTFALL# 004 & S1WET TEST (Y OR N): ☐ N FREQUENCY: _____ A.E.C. _____ LIMIT: _____

PARAMETER	UNITS	MAXIMUM DAILY LIMIT	WEEKLY AVERAGE LIMIT	AVERAGE MONTHLY LIMIT	MONITORING FREQUENCY
pH	SU	MONITOR		MONITOR	ONCE/QUARTER
TEMPERATURE	°C	MONITOR		MONITOR	ONCE/MONTH
HARDNESS, TOTAL	mg/L	MONITOR		MONITOR	ONCE/QUARTER
CADMIUM, TOTAL RECOVERABLE	µg/L	MONITOR		MONITOR	ONCE/QUARTER
COPPER, TOTAL RECOVERABLE	µg/L	MONITOR		MONITOR	ONCE/QUARTER
LEAD, TOTAL RECOVERABLE	µg/L	MONITOR		MONITOR	ONCE/QUARTER
SELENIUM, TOTAL RECOVERABLE	µg/L	MONITOR		MONITOR	ONCE/QUARTER
THALLIUM, TOTAL RECOVERABLE	µg/L	MONITOR		MONITOR	ONCE/QUARTER
ZINC, TOTAL RECOVERABLE	µg/L	MONITOR		MONITOR	ONCE/QUARTER

Derivation and Discussion of Limits

Wasteload allocations (WLA) were calculated using water quality criteria and the dilution equation below:

$$C = \frac{(C_s * Q_s) + (C_e * Q_e)}{(Q_e + Q_s)} \quad (\text{EPA/505/2-90-001, Section 4.5.5})$$

Where C = downstream concentration

C_s = upstream concentration

Q_s = upstream flow (cfs)

C_e = effluent concentration

Q_e = effluent flow (cfs)

Chronic wasteload allocations were determined using applicable chronic water quality criteria (CCC: criteria continuous concentration) and stream volume of flow at the edge of the mixing zone (MZ). Acute wasteload allocations were determined using applicable acute water quality criteria (CMC: criteria maximum concentration) and stream volume of flow.

Water quality based maximum daily and average monthly effluent limitations were calculated using methods and procedures outlined in USEPA's "Technical Support Document For Water Quality-based Toxics Control" (EPA/505/2-90-001).

OUTFALL 001

WATER QUALITY AND TECHNOLOGY BASED EFFLUENT LIMITS

- **Biochemical Oxygen Demand** 10 CSR 20-7.015(8)(B)1.
- **Total Suspended Solids** 10 CSR 20-7.015(8)(B)1.
- **pH.** pH shall be maintained in the range from six to nine (6 – 9) standard units [10 CSR 20-7.015(8)(B)2.].
- **Ammonia as Nitrogen.** Total Ammonia Nitrogen – Early Life Stages Present criteria apply 10 CSR 20-7.031(4)(B)7.C. & Table B3. Background ammonia as nitrogen for receiving stream is assumed to be = 0.01mg/L.

Season	Temp (°C)	pH (SU)	Total Ammonia Nitrogen CCC (mg/L)	Total Ammonia Nitrogen CMC (mg/L)
Summer	26	7.8	1.5	12.1
Winter	6	7.8	3.1	12.1

Summer: May 1 – October 31, Winter: November 1 – April 30

$$C_e = ((Q_e + Q_s)C - (Q_s * C_s))/Q_e$$

Summer

Chronic

$$C_e = ((0.047 + 0.0)1.5 - (0.0 * 0.01))/0.047$$

$$C_e = 1.5 \text{ mg/L}$$

$$\text{WLA}_c = 1.5 \text{ mg/L}$$

Acute

$$C_e = ((0.047 + 0.0)12.1 - (0.0 * 0.01))/0.047$$

$$C_e = 12.1 \text{ mg/L}$$

$$\text{WLA}_a = 12.1 \text{ mg/L}$$

$$\text{LTA}_c = 1.5(0.780) = 1.2 \text{ mg/L}$$

$$\text{LTA}_a = 12.1 (0.321) = 3.9 \text{ mg/L}$$

$$[\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}, n=30]$$

$$[\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}]$$

Use most protective number of LTA_c or LTA_a .

$$\text{MDL} = 1.2(3.11) = 3.7 \text{ mg/L}$$

$$\text{AML} = 1.2(1.55) = 1.9 \text{ mg/L}$$

$$[\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$[\text{CV} = 0.6, 95^{\text{th}} \text{ Percentile}, n = 4]$$

Winter

Chronic

$$C_e = ((0.047 + 0.0)3.1 - (0.0 * 0.01)) / 0.047$$

$$C_e = 3.1 \text{ mg/L}$$

$$\text{WLA}_c = 3.1 \text{ mg/L}$$

Acute

$$C_e = ((0.047 + 0.0)12.1 - (0.0 * 0.01)) / 0.047$$

$$C_e = 12.2 \text{ mg/L}$$

$$\text{WLA}_a = 12.2 \text{ mg/L}$$

$$\text{LTA}_c = 3.1(0.780) = 2.4 \text{ mg/L}$$

$$\text{LTA}_a = 12.2(0.321) = 3.9 \text{ mg/L}$$

$$[\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}, n=30]$$

$$[\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}]$$

Use most protective number of LTA_c or LTA_a .

$$\text{MDL} = 2.4(3.11) = 7.5 \text{ mg/L}$$

$$\text{AML} = 2.4(1.55) = 3.7 \text{ mg/L}$$

$$[\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$[\text{CV} = 0.6, 95^{\text{th}} \text{ Percentile}, n = 4]$$

- **Fecal Coliform** Discharge shall not contain more than a monthly geometric mean of 400 colonies/ 100 mL and a daily maximum of 1000 colonies/100 mL during the recreational season (April 1 – October 31) [10 CSR 20-7.015(8)(B)4.A.] Future renewals of the facility operating permit will contain effluent limitations for E. coli which will replace fecal coliform as the applicable bacteria criteria in Missouri's water quality standards.
- **Total Residual Chlorine**. Warm water acute criteria = 19 µg/L, warm water chronic criteria = 10 µg/L [10 CSR 20-7.031, Table A]. Background = 0.0 mg/L.

Chronic

$$C_e = ((0.047 + 0.0)10 - (0.0 * 0.0)) / 0.047$$

$$C_e = 10 \text{ µg/L}$$

$$\text{WLA}_c = 10 \text{ µg/L}$$

Acute

$$C_e = ((0.047 + 0.0)19 - (0.0 * 0.0)) / 0.047$$

$$C_e = 19 \text{ µg/L}$$

$$\text{WLA}_a = 19 \text{ µg/L}$$

$$\text{LTA}_c = 10(0.527) = 5.3 \text{ µg/L}$$

$$\text{LTA}_a = 19(0.321) = 6.1 \text{ µg/L}$$

$$[\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$[\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}]$$

Use most protective number of LTA_c or LTA_a .

$$\text{MDL} = 5.3(3.11) = 16.5 \text{ µg/L}$$

$$\text{AML} = 5.3(1.55) = 8.2 \text{ µg/L}$$

$$[\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$[\text{CV} = 0.6, 95^{\text{th}} \text{ Percentile}, n = 4]$$

- **Copper, Total Recoverable** Effluent limits for this parameter moved to Outfall 003, because treatment for this parameter occurs at that outfall.
- **Thallium, Total Recoverable** Effluent limits for this parameter moved to Outfall 003, because treatment for this parameter occurs at that outfall.

Categorical effluent limits:

PRIMARY LEAD SUBCATEGORY

(j) Employee hand wash given in (lbs/10⁹ lbs of lead bullion produced)

<u>Pollutant</u>	<u>Daily Max.</u>	<u>Monthly Avg.</u>
Lead (BAT)	0.924	0.429
Zinc (BAT)	3.366	1.386
TSS (BPT)*	135.300	64.350
Cadmium (DD)(BAT)	0.660	0.264

* An allowance was given for TSS in both BPT and in NSPS, but not in the BAT. BCT is to address this issue, however it has not yet been developed, so the BPT allowance is being used.

(k) Respirator wash given in (lbs/10⁹ lbs of lead bullion produced)

<u>Pollutant</u>	<u>Daily Max.</u>	<u>Monthly Avg.</u>
Lead (BAT)	1.484	0.689
Zinc (BAT)	5.406	2.226
TSS (BPT)*	217.300	103.400
Cadmium (DD)(BAT)	1.060	0.424

pH within the range of 7.5 to 10.0 at all times.

CATEGORICAL EFFLUENT MASS LIMITATION CALCULATIONS

The effluent mass limitations for cadmium, lead, zinc, and TSS from the process wastewater contribution to Outfall #001, are calculated using the foregoing effluent limits (scope flows). The daily production rate of 0.000713 billion pounds of primary lead bullion given in the application for permit renewal was used as the multiplier. To those mass limits there are added non-scope effluent mass limit allotments.

For Outfall #001, the effect of the flow from employee rest rooms for 185 employees, and showers for 125 employees (OSHA requirement) has been added. Using {10 CSR 20 - 8.020(11)(B)3} design figures of 10 gallons/person/day for employee showers and 15 gallons/person/day for employee rest room usage. For Outfall #003, the effect of the stormwater flow has been added.

First, using the flow of 15 gal/person/day for 185 employees we back calculate from an allowance of 45 mg/L (daily maximum) for domestic waste from the restrooms. Then we back calculate from an allowance of 30 mg/L (monthly average) for domestic waste.

TSS daily maximum Outfall #001

$$(2820 \text{ gal/day})(45 \text{ mg/L})(3.785 \text{ l/gal})(2.205 \times 10^{-6} \text{ lbs/mg}) = 1.0591 \text{ lbs/day}$$

TSS monthly average Outfall #001

$$(2820 \text{ gal/day})(30\text{mg/L})(3.785 \text{ 1/gal})(2.205 \times 10^{-6} \text{ lbs/mg}) = 0.7061 \text{ lbs/day}$$

There is also a non-scope effluent mass limit allotment for cadmium, lead, zinc and TSS given for shower water. The flow from the employee showers at 10 gallons/person/day for 125 employees is used in the calculation. Here the allowed concentration values are obtained from Table VII-21, on page 248 of Volume I, of the EPA Final Development Document for Effluent Limitations Guidelines and Standards for the Nonferrous Metals Manufacturing Point Source Category, (non-scope flows) for monthly average and daily maximum for each of the contaminants.

Lead daily maximum Outfall #001

$$(1250 \text{ gal/day})(0.28 \text{ mg/L})(3.785 \text{ 1/gal})(2.205 \times 10^{-6} \text{ lbs/mg}) = 0.0029 \text{ lbs/day}$$

Lead monthly average Outfall #001

$$(1250 \text{ gal/day})(0.11 \text{ mg/L})(3.785 \text{ 1/gal})(2.205 \times 10^{-6} \text{ lbs/mg}) = 0.0011 \text{ lbs/day}$$

Zinc daily maximum Outfall #001

$$(1250 \text{ gal/day})(1.02 \text{ mg/L})(3.785 \text{ 1/gal})(2.205 \times 10^{-6} \text{ lbs/mg}) = 0.0106 \text{ lbs/day}$$

Zinc monthly average Outfall #001

$$(1250 \text{ gal/day})(0.31 \text{ mg/L})(3.785 \text{ 1/gal})(2.205 \times 10^{-6} \text{ lbs/mg}) = 0.0032 \text{ lbs/day}$$

Cadmium daily maximum Outfall #001

$$(1250 \text{ gal/day})(0.20 \text{ mg/L})(3.785 \text{ 1/gal})(2.205 \times 10^{-6} \text{ lbs/mg}) = 0.0021 \text{ lbs/day}$$

Cadmium monthly average Outfall #001

$$(1250 \text{ gal/day})(0.08 \text{ mg/L})(3.785 \text{ 1/gal})(2.205 \times 10^{-6} \text{ lbs/mg}) = 0.0008 \text{ lbs/day}$$

TSS daily maximum Outfall #001

$$(1250 \text{ gal/day})(15 \text{ mg/L})(3.785 \text{ 1/gal})(2.205 \times 10^{-6} \text{ lbs/mg}) = 0.1565 \text{ lbs/day}$$

TSS monthly average Outfall #001

$$(1250 \text{ gal/day})(10 \text{ mg/L})(3.785 \text{ 1/gal})(2.205 \times 10^{-6} \text{ lbs/mg}) = 0.104324 \text{ lbs/day}$$

DAILY MAXIMUM

LEAD (CATEGORICAL ALLOWANCES) Outfall #001

employee hand wash	$(0.000713 \times 10^9 \#) \times (0.924 \# / 10^9 \#)$	= 0.00066 #
respirator wash	$(0.000713 \times 10^9 \#) \times (1.484 \# / 10^9 \#)$	= 0.00106 #
employee showers (from above)		= 0.0029 #
TOTAL		= 0.00462 #

MONTHLY AVERAGE

LEAD (CATEGORICAL ALLOWANCES) Outfall #001

employee hand wash	$(0.000713 \times 10^9 \#) \times (0.429 \# / 10^9 \#)$	= 0.00031 #
respirator wash	$(0.000713 \times 10^9 \#) \times (0.689 \# / 10^9 \#)$	= 0.00049 #
employee showers (from above)		= 0.0011 #
TOTAL		= 0.0019 #

DAILY MAXIMUM

ZINC (CATEGORICAL ALLOWANCES) Outfall #001

employee hand wash	$(0.000713 \times 10^9 \#) \times (3.366 \# / 10^9 \#)$	= 0.0024 #
respirator wash	$(0.000713 \times 10^9 \#) \times (5.406 \# / 10^9 \#)$	= 0.0039 #
employee showers (from above)		= 0.0106 #
TOTAL		= 0.0169 #

MONTHLY AVERAGE

ZINC (CATEGORICAL ALLOWANCES) Outfall #001

employee hand wash	$(0.000713 \times 10^9 \#) \times (1.386 \# / 10^9 \#)$	= 0.00099 #
respirator wash	$(0.000713 \times 10^9 \#) \times (2.226 \# / 10^9 \#)$	= 0.00159 #
employee showers (from above)		= 0.0032 #
TOTAL		= 0.00578 #

DAILY MAXIMUM

CADMIUM (CATEGORICAL ALLOWANCES) Outfall #001

employee hand wash (DD)	$(0.000713 \times 10^9 \#) \times (0.660 \# / 10^9 \#)$	= 0.00047 #
respirator wash (DD)	$(0.000713 \times 10^9 \#) \times (1.060 \# / 10^9 \#)$	= 0.00076 #
employee showers (from above)		= 0.0021 #
TOTAL		= 0.00333 #

MONTHLY AVERAGE

CADMIUM (CATEGORICAL ALLOWANCES) Outfall #001

employee hand wash (DD)	$(0.000713 \times 10^9 \#) \times (0.264 \# / 10^9 \#)$	= 0.000188 #
respirator wash (DD)	$(0.000713 \times 10^9 \#) \times (0.424 \# / 10^9 \#)$	= 0.000302 #
employee showers (from above)		= 0.0008 #
TOTAL		= 0.00129 #

DAILY MAXIMUM

TSS (CATEGORICAL ALLOWANCES) Outfall #001

employee hand wash	$(0.000713 \times 10^9 \#) \times (135.300 \# / 10^9 \#)$	= 0.096 #
respirator wash (BPT)	$(0.000713 \times 10^9 \#) \times (217.300 \# / 10^9 \#)$	= 0.155 #
employee rest room (from above)		= 1.059 #
employee showers (from above)		= 0.1565 #
TOTAL		= 1.4665 #

MONTHLY AVERAGE

TSS (CATEGORICAL ALLOWANCES) Outfall #001

employee hand wash	$(0.000713 \times 10^9 \#) \times (64.350 \# / 10^9 \#)$	= 0.046 #
respirator wash (BPT)	$(0.000713 \times 10^9 \#) \times (103.400 \# / 10^9 \#)$	= 0.074 #
employee rest room (from above)		= 0.7061 #
employee showers (from above)		= 0.1043 #

TOTAL

= 0.9304 #

The pH must be maintained within the range of 7.5 to 10.0 at all times.

Because mass based categorical limits exist for Total Suspended Solids, both the categorical mass based limit and the regulatory technology based concentration limit will appear in the permit. In order to meet the mass based limit the facility must achieve less than the concentration based limit at design flows. Higher volume of discharges must achieve a lower concentration of suspended solids.

OUTFALL 002

Non-contact cooling water is not subject to categorical limits, therefore water quality based effluent limits will be applied.

- **pH**. pH shall be maintained in the range from six to nine (6 – 9) standard units [10 CSR 20-7.015(8)(B)2.].
- **Total Residual Chlorine**. Acute criteria = 19 µg/L, chronic criteria = 10 µg/L [10 CSR 20-7.031, Table A]. Background = 0.0 mg/L.

Chronic

$$C_e = ((0.5 + 0.0)10 - (0.0 * 0.0))/0.5$$

$$C_e = 10 \text{ g/L}$$

$$WLA_c = 10 \text{ g/L}$$

Acute

$$C_e = ((0.5 + 0.0)19 - (0.0 * 0.0))/0.5$$

$$C_e = 19 \text{ g/L}$$

$$WLA_a = 19 \text{ g/L}$$

$$LTA_c = 10(0.527) = 5.3 \text{ mg/L}$$

[CV = 0.6, 99th Percentile]

$$LTA_a = 19(0.321) = 6.0 \text{ mg/L}$$

[CV = 0.6, 99th Percentile]

Use most protective number of LTA_c or LTA_a. = 0.005 mg/L

$$MDL = 5.3(3.11) = 16.5 \text{ µg/L}$$

[CV = 0.6, 99th Percentile]

$$AML = 5.3(1.55) = 8.2 \text{ µg/L}$$

[CV = 0.6, 95th Percentile, n = 4]

- **Temperature** Since Big Creek is designated as “cool-water fishery” the stream temperature should not exceed 84 degrees F, or be raised more than 5 degrees F above ambient temperature. The temperature of the effluent from Outfall #002 and Big Creek immediately above the mouth of Scroggins Branch shall be monitored. The temperature at the water-quality compliance point Outfall #004 shall not be more than 5 degrees F above the temperature immediately above Scroggins Branch, and shall not exceed 84 degrees F.

Metals

Effluent limitations for total recoverable metals were developed using methods and procedures outlined in EPA/505/2-90-001 and “The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From A Dissolved Criterion” (EPA 823-B-96-007). General warm-water fishery criteria apply and water hardness = 74.3 mg/L.

Due to the absence of contemporaneous effluent and instream data for total recoverable metals, dissolved metals, hardness, and total suspended solids with which to calculate metals translators, partitioning between the dissolved and absorbed phases was assumed to be minimal (Section 5.7.3, EPA/505/2-90-001). Freshwater criteria conversion factors for dissolved metals were used as the metals translator as recommended in guidance (Section 1.3, 1.5.3, and Table 1, EPA 823-B-96-007). If concurrent site-specific data for total recoverable metals, dissolved metals, hardness, and total suspended solids are provided to the department, partitioning evaluations may be considered and site-specific translators developed.

METAL	CONVERSION FACTORS	
	ACUTE	CHRONIC
Cadmium	0.956	0.921
Copper	0.960	0.960
Lead	0.834	0.834
Zinc	0.978	0.986

* Conversion factors for Cd and Pb are hardness dependent. Values calculated using equation found in Section 1.3 of EPA 823-B-96-007 and hardness = 74.3 mg/L.

TMDL Wasteload Allocations:

Daily Maximum, Dissolved Cadmium 0.001 lbs/day
Daily Maximum, Dissolved Lead 0.012 lbs/day
Daily Maximum, Dissolved Zinc 0.512 lbs/day

TMDL EFFLUENT LIMITS

Daily Maximum, Dissolved Cadmium 0.5 µg/L
Daily Maximum, Dissolved Lead 5 µg/L
Daily Maximum, Dissolved Zinc 213 µg/L

Effluent limits from the TMDL were developed to prevent exceedance of Water Quality Standards in Big Creek and are not to be exceeded. The Maximum Daily Limit is therefore set at the TMDL effluent limit. The limits are the dissolved fraction, and must be converted to total recoverable for effluent limits. The Average Monthly Limit is calculated by determining the Long Term Average and then the Limit using default multipliers found in the Technical Support Document. For this conversion the TMDL limit is used as an acute wasteload allocation.

- **Total Recoverable Cadmium**

$$WLA = 0.5/0.956 = 0.52 \text{ µg/L}$$

$$LTAA = 0.52(0.321) = 0.17 \text{ µg/L} \quad [CV = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$MDL = 0.52 \text{ µg/L}$$

$$AML = 0.17(1.55) = 0.26 \text{ µg/L} \quad [CV = 0.6, 95^{\text{th}} \text{ Percentile, } n = 4]$$

- **Total Recoverable Lead**

$$WLA = 5.0/0.834 = 6.0 \text{ µg/L}$$

$$LTAA = 6.0(0.321) = 1.9 \text{ µg/L} \quad [CV = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$MDL = 6.0 \text{ µg/L}$$

$$AML = 1.9(1.55) = 2.9 \text{ µg/L} \quad [CV = 0.6, 95^{\text{th}} \text{ Percentile, } n = 4]$$

- **Total Recoverable Zinc**

$$WLA = 213/0.978 = 218 \text{ µg/L}$$

$$LTAA = 218(0.321) = 70 \text{ µg/L} \quad [CV = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$\text{MDL} = 218 \mu\text{g/L}$$

$$\text{AML} = 70(1.55) = 109 \mu\text{g/L}$$

$$[\text{CV} = 0.6, 95^{\text{th}} \text{ Percentile}, n = 4]$$

- **Thallium, Total Recoverable** Human Health Protection [Fish Consumption] Chronic Criteria = 6.3 $\mu\text{g/L}$.

Chronic

$$C_e = ((0.5 + 0.0)6.3 - (0.0 * 0.0))/0.45$$

$$C_e = 6.3 \mu\text{g/L}$$

$$\text{WLA}_c = 6.3 \mu\text{g/L}$$

$$\text{LTA}_c = 6.3(0.527) = 3.3 \mu\text{g/L}$$

$$[\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$\text{MDL} = 3.3(3.11) = 10.3 \mu\text{g/L}$$

$$[\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$\text{AML} = 3.3(1.55) = 5.1 \mu\text{g/L}$$

$$[\text{CV} = 0.6, 95^{\text{th}} \text{ Percentile}, n = 4]$$

- **Copper, Total Recoverable** Protection of Aquatic Live Chronic Criteria = 4 $\mu\text{g/L}$, Acute Criteria = 7 $\mu\text{g/L}$.

$$\text{Chronic} = 4.0/0.960 = 4.2 \mu\text{g/L}$$

$$\text{Acute} = 7.0/0.960 = 7.3 \mu\text{g/L}$$

Chronic

$$C_e = ((0.5 + 0.0)4.2 - (0.0 * 0.0))/0.45$$

$$C_e = 4.2 \mu\text{g/L}$$

$$\text{WLA}_c = 4.2 \mu\text{g/L}$$

Acute

$$C_e = ((0.45 + 0.0)7.3 - (0.0 * 0.0))/0.45$$

$$C_e = 7.3 \mu\text{g/L}$$

$$\text{WLA}_c = 7.3 \mu\text{g/L}$$

$$\text{LTA}_c = 4.2(0.527) = 2.2 \mu\text{g/L}$$

$$[\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$\text{LTA}_a = 7.3(0.321) = 2.3 \mu\text{g/L}$$

$$[\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}]$$

Use most protective number of LTA_c or LTA_a .

$$\text{MDL} = 2.2(3.11) = 6.8 \mu\text{g/L}$$

$$[\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$\text{AML} = 2.2(1.55) = 3.4 \mu\text{g/L}$$

$$[\text{CV} = 0.6, 95^{\text{th}} \text{ Percentile}, n = 4]$$

- **Selenium, Total Recoverable** Protection of Aquatic Live Chronic Criteria = 5.0 $\mu\text{g/L}$.

Chronic

$$C_e = ((0.5 + 0.0)5.0 - (0.0 * 0.0))/0.45$$

$$C_e = 5.0 \mu\text{g/L}$$

$$\text{WLA}_c = 5.0 \mu\text{g/L}$$

$$\text{LTA}_c = 5.0(0.527) = 2.6 \mu\text{g/L}$$

$$[\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$\text{MDL} = 2.6(3.11) = 8.1 \mu\text{g/L}$$

$$[\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$\text{AML} = 2.6(1.55) = 4.0 \mu\text{g/L}$$

$$[\text{CV} = 0.6, 95^{\text{th}} \text{ Percentile}, n = 4]$$

OUTFALL 003

Water Quality and Technology Based Effluent Limits:

- **Total Suspended Solids** 10 CSR 20-7.015(8)(B)1. Discharge of the domestic wastewater from outfall 001 is not allowed to be reduced in quality by the treatment process at outfall 003.
- **pH**. pH shall be maintained in the range from six to nine (6 – 9) standard units [10 CSR 20-7.015(8)(B)2].
- **Ammonia as Nitrogen** Monitoring only to confirm that this outfall is not a significant source of Ammonia.
- **Total Residual Chlorine** Monitoring only to confirm that this outfall is not a significant source of Chlorine.

Metals

Effluent limitations for total recoverable metals were developed using methods and procedures outlined in EPA/505/2-90-001 and “The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From A Dissolved Criterion” (EPA 823-B-96-007). General warm-water fishery criteria apply and water hardness = 74.3 mg/L.

Due to the absence of contemporaneous effluent and instream data for total recoverable metals, dissolved metals, hardness, and total suspended solids with which to calculate metals translators, partitioning between the dissolved and absorbed phases was assumed to be minimal (Section 5.7.3, EPA/505/2-90-001). Freshwater criteria conversion factors for dissolved metals were used as the metals translator as recommended in guidance (Section 1.3, 1.5.3, and Table 1, EPA 823-B-96-007). If concurrent site-specific data for total recoverable metals, dissolved metals, hardness, and total suspended solids are provided to the department, partitioning evaluations may be considered and site-specific translators developed.

METAL	CONVERSION FACTORS	
	ACUTE	CHRONIC
Cadmium	0.956	0.921
Copper	0.960	0.960
Lead	0.834	0.834
Zinc	0.978	0.986

* Conversion factors for Cd and Pb are hardness dependent. Values calculated using equation found in Section 1.3 of EPA 823-B-96-007 and hardness = 74.3 mg/L.

TMDL Wasteload Allocations:

Daily Maximum, Dissolved Cadmium 0.001 lbs/day
Daily Maximum, Dissolved Lead 0.012 lbs/day
Daily Maximum, Dissolved Zinc 0.512 lbs/day

TMDL EFFLUENT LIMITS

Daily Maximum, Dissolved Cadmium 0.5 µg/L
Daily Maximum, Dissolved Lead 5 µg/L
Daily Maximum, Dissolved Zinc 213 µg/L

Effluent limits from the TMDL were developed to prevent exceedance of Water Quality Standards in Big Creek and are not to be exceeded. The Maximum Daily Limit is therefore set at the TMDL effluent limit. The limits are the dissolved fraction, and must be converted to total recoverable for effluent limits. The Average Monthly Limit is calculated by determining the Long Term Average and then the Limit using default multipliers found in the Technical Support Document. For this conversion the TMDL limit is used as an acute wasteload allocation.

- **Total Recoverable Cadmium**

$$WLA = 0.5/0.956 = 0.52 \text{ } \mu\text{g/L}$$

$$LTAa = 0.52(0.321)=0.17 \text{ } \mu\text{g/L} \quad [CV = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$MDL = 0.52 \text{ } \mu\text{g/L}$$

$$AML = 0.17(1.55)=0.26 \text{ } \mu\text{g/L} \quad [CV = 0.6, 95^{\text{th}} \text{ Percentile, } n = 4]$$

- **Total Recoverable Lead**

$$WLA = 5.0/0.834 = 6.0 \text{ } \mu\text{g/L}$$

$$LTAa = 6.0(0.321)=1.9 \text{ } \mu\text{g/L} \quad [CV = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$MDL = 6.0 \text{ } \mu\text{g/L}$$

$$AML = 1.9(1.55)=2.9 \text{ } \mu\text{g/L} \quad [CV = 0.6, 95^{\text{th}} \text{ Percentile, } n = 4]$$

- **Total Recoverable Zinc**

$$WLA = 213/0.978 = 218 \text{ } \mu\text{g/L}$$

$$LTAa = 218(0.321)=70 \text{ } \mu\text{g/L} \quad [CV = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$MDL = 218 \text{ } \mu\text{g/L}$$

$$AML = 70(1.55)=109 \text{ } \mu\text{g/L} \quad [CV = 0.6, 95^{\text{th}} \text{ Percentile, } n = 4]$$

- **Thallium, Total Recoverable** Human Health Protection [Fish Consumption] Chronic Criteria = 6.3 $\mu\text{g/L}$

Chronic

$$C_e = ((0.45 + 0.0)6.3 - (0.0 * 0.0))/0.45$$

$$C_e = 6.3 \text{ } \mu\text{g/L}$$

$$WLA_c = 6.3 \text{ } \mu\text{g/L}$$

$$LTA_c = 6.3(0.527)= 3.3 \text{ } \mu\text{g/L} \quad [CV = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$MDL = 3.3(3.11)= 10.3 \text{ } \mu\text{g/L} \quad [CV = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$AML = 3.3(1.55)= 5.1 \text{ } \mu\text{g/L} \quad [CV = 0.6, 95^{\text{th}} \text{ Percentile, } n = 4]$$

- **Copper, Total Recoverable** Protection of Aquatic Live Chronic Criteria = 4 $\mu\text{g/L}$, Acute Criteria = 7 $\mu\text{g/L}$.

$$\text{Chronic} = 4.0/0.960 = 4.2 \text{ } \mu\text{g/L}$$

$$\text{Acute} = 7.0/0.960 = 7.3 \text{ } \mu\text{g/L}$$

Chronic

$$C_e = ((0.45 + 0.0)4.2 - (0.0 * 0.0))/0.45$$

$$C_e = 4.2 \text{ } \mu\text{g/L}$$

$$WLA_c = 4.2 \text{ } \mu\text{g/L}$$

Acute

$$C_e = ((0.45 + 0.0)7.3 - (0.0 * 0.0))/0.45$$

$$C_e = 7.3 \text{ } \mu\text{g/L}$$

$$WLA_c = 7.3 \text{ } \mu\text{g/L}$$

$$LTA_c = 4.2(0.527) = 2.2 \text{ } \mu\text{g/L} \quad [\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$LTA_a = 7.3(0.321) = 2.3 \text{ } \mu\text{g/L} \quad [\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}]$$

Use most protective number of LTA_c or LTA_a .

$$\text{MDL} = 2.2(3.11) = 6.8 \text{ } \mu\text{g/L} \quad [\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$\text{AML} = 2.2(1.55) = 3.4 \text{ } \mu\text{g/L} \quad [\text{CV} = 0.6, 95^{\text{th}} \text{ Percentile, } n = 4]$$

- **Selenium, Total Recoverable** Protection of Aquatic Live Chronic Criteria = 5.0 $\mu\text{g/L}$.

Chronic

$$C_e = ((0.45 + 0.0)5.0 - (0.0 * 0.0))/0.45$$

$$C_e = 5.0 \text{ } \mu\text{g/L}$$

$$WLA_c = 5.0 \text{ } \mu\text{g/L}$$

$$LTA_c = 5.0(0.527) = 2.6 \text{ } \mu\text{g/L} \quad [\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$\text{MDL} = 2.6(3.11) = 8.1 \text{ } \mu\text{g/L} \quad [\text{CV} = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$\text{AML} = 2.6(1.55) = 4.0 \text{ } \mu\text{g/L} \quad [\text{CV} = 0.6, 95^{\text{th}} \text{ Percentile, } n = 4]$$

Categorical Limits:

The effluent mass limitations for cadmium, lead, zinc and TSS from the process stormwater*, are calculated using the contaminant values found in Table VII-21. The flow rate used for stormwater runoff was 2.4 million gallons per day. This is based on the treatment plant design flow rate of 200 gallons per minute (0.288 MGD), rather than any specific storm event.

Lead daily maximum Outfall #003

$$(0.288 \times 10^6 \text{ gal/day})(0.28 \text{ mg/L})(3.785 \text{ 1/gal})(2.205 \times 10^{-6} \text{ lbs/mg}) = 0.673 \text{ lbs/day}$$

Lead monthly average Outfall #003

$$(0.288 \times 10^6 \text{ gal/day})(0.11 \text{ mg/L})(3.785 \text{ 1/gal})(2.205 \times 10^{-6} \text{ lbs/mg}) = 0.264 \text{ lbs/day}$$

Zinc daily maximum Outfall #003

$$(0.288 \times 10^6 \text{ gal/day})(1.02 \text{ mg/L})(3.785 \text{ 1/gal})(2.205 \times 10^{-6} \text{ lbs/mg}) = 2.452 \text{ lbs/day}$$

Zinc monthly average Outfall #003

$$(0.288 \times 10^6 \text{ gal/day})(0.31 \text{ mg/L})(3.785 \text{ 1/gal})(2.205 \times 10^{-6} \text{ lbs/mg}) = 0.745 \text{ lbs/day}$$

Cadmium daily maximum Outfall #003

$$(0.288 \times 10^6 \text{ gal/day})(0.20 \text{ mg/L})(3.785 \text{ 1/gal})(2.205 \times 10^{-6} \text{ lbs/mg}) = 0.481 \text{ lbs/day}$$

Cadmium monthly average Outfall #003

$$(0.288 \times 10^6 \text{ gal/day})(0.08 \text{ mg/L})(3.785 \text{ 1/gal})(2.205 \times 10^{-6} \text{ lbs/mg}) = 0.192 \text{ lbs/day}$$

TSS daily maximum Outfall #003

$$(0.288 \times 10^6 \text{ gal/day})(15.0 \text{ mg/L})(3.785 \text{ 1/gal})(2.205 \times 10^{-6} \text{ lbs/mg}) = 36.054 \text{ lbs/day}$$

TSS monthly average Outfall #003

$$(0.288 \times 10^6 \text{ gal/day})(10.0 \text{ mg/L})(3.785 \text{ 1/gal})(2.205 \times 10^{-6} \text{ lbs/mg}) = 24.036 \text{ lbs/day}$$

* The process stormwater defined here does not include the stormwater isolated and collected in the area of the plant regulated under the Missouri Hazardous Waste Law.

Parameter	Categorical Limits lbs/day	TMDL Limits lbs/day
Cadmium	0.481	0.001
Lead	0.673	0.012
Zinc	2.452	0.512

Because the TMDL limits for Cadmium, Lead and Zinc are more protective than the categorical limits, the TMDL limits will be used.

10 CSR 20-7.031(4)(E) and 10 CSR 20-7.015(9)(G)1. require that discharges from this facility not exceed 9 pH standard units. Categorical limits require discharges not below 7.5 standard units. Therefore the pH limits are set at 7.5-9 standard units.

Because mass based categorical limits exist for Total Suspended Solids, both the categorical mass based limit and the regulatory technology based concentration limit will appear in the permit. In order to meet the mass based limit the facility must achieve less than the concentration based limit at design flows. Higher volume of discharges must achieve a lower concentration of suspended solids.

Outfall 005

- **Hardness, Cadmium, Copper, Lead, Selenium, Thallium and Zinc** Monitoring for these parameters to determine contributions from this facility in to the receiving stream.

Outfall 006

Outfall 006 is an emergency discharge from the holding basin at the process wastewater treatment facility. Discharges are to be very short in nature related to excessive precipitation. All of the concentration based limits from outfall 003 apply. Mass based limits are not applied due to the rarity of discharges from this outfall.

Outfall 004 & S1 Outfall 004 is downstream monitoring. S1 formerly named "Upstream Monitoring Point".

- **Temperature, Hardness, Cadmium, Copper, Lead, Selenium, Thallium and Zinc** Instream monitoring to evaluate compliance with temperature standards and to evaluate recovery of the receiving stream.

Reviewer: Curt Gateley
Date: 6-1-06
Unit Chief: Refaat Mefrakis

Monitoring and effluent limits contained within this document have been developed in accordance with EPA guidelines using the best available data and are believed to be consistent with Missouri's Water Quality Standards and Effluent Regulations. If additional water quality data or are available that may affect the recommended monitoring and effluent limits, please forward these data and information to the author.